CENTRUM TECHNIKI OKRĘTOWEJ S.A.
Ship Design and Research Centre S.A.

RESEARCH AND DEVELOPMENT DEPARTMENT

ENVIRONMENTAL LABORATORIES DIVISION

VIBROACOUSTIC TESTS LABORATORY

TEST REPORT

No RS-2016/B-369/E

Measurement of sound attenuation for office screen made of "Wall" acoustic panels, manufactured by Creative Design Group Szymon Rychlik

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Specimen No : ....0....

Contents

1. Basic data

Tab. 1. Summary of data and test parameters.

Customer: Creative Design Group, Szymon Rychlik Sp. Jawna ul. Chodkiewicza 3/118 02-593 Warszawa	**Order (e-mail):** 08.07.2016 **CTO S.A. order number**: 8.372.03.223
	Delivery date of test object: 16.09.2016
Name and type of test object: office screen made of Wall acoustic panels	**Date and place of measurements:** 20.09.2016 Gdańsk, Ship Design And Research Centre Environmental Laboratories Division Vibroacoustic Tests Laboratory
Manufacturer: Creative Design Group, Szymon Rychlik Sp. Jawna ul. Chodkiewicza 3/118 02-593 Warszawa	**The method of measurement and analysis of the results:** According to the standards: • Standard No.: PN-EN ISO 354:2005 • Standard No.: PN-EN ISO 11654:1997
Designation of the test object in CTO S.A.: LA645	**Conditions of measurement** / **(start / end) of measurement** Air humidity: 72% Temperature: 16,5°C Atmospheric pressure: 1011hPa

Measuring equipment:	**Channel 1**	**Channel 2**
measuring wires	0SvankK3	1SvankK3
microphone	G.R.A.S. 40AR Serial No. 119088	G.R.A.S. 40AR Serial No. 119096
preamplifier	G.R.A.S. 26TK Serial No. 210489	G.R.A.S. 26TK Serial No. 210490
sound analyzer	Norsonic type N–121 Serial No. 31378	
calibrator	Larson Davis CAL200, Serial No. 11524	
sound source	Larson Davis BAS001 Serial No. 1225-DIC08	
thermo-hygro-barometer	type LB-706BP, No. 846 type LB-701, No. 3605	
measuring tape	RS/0003	

Sound absorption results:	
Measured values	Actual values
ΔL_s - office screen sound attenuation and evaluation index	**Results are presented in chapter 5**

Attention: Presented values are valid only for the tested object.

2. Test method

Measurement of sound attenuation of "Creative Design Group Szymon Rychlik" office screen was performed according to PN ISO 10053:2001 "Acoustics - Measurement of office screen sound attenuation under specific laboratory conditions". Measurements were carried out in Ship Design and Research Centre in Gdańsk according to methodology in open landscape. Used measuring setup complies with PN ISO 10053:2001 and it is shown in fig. 1.

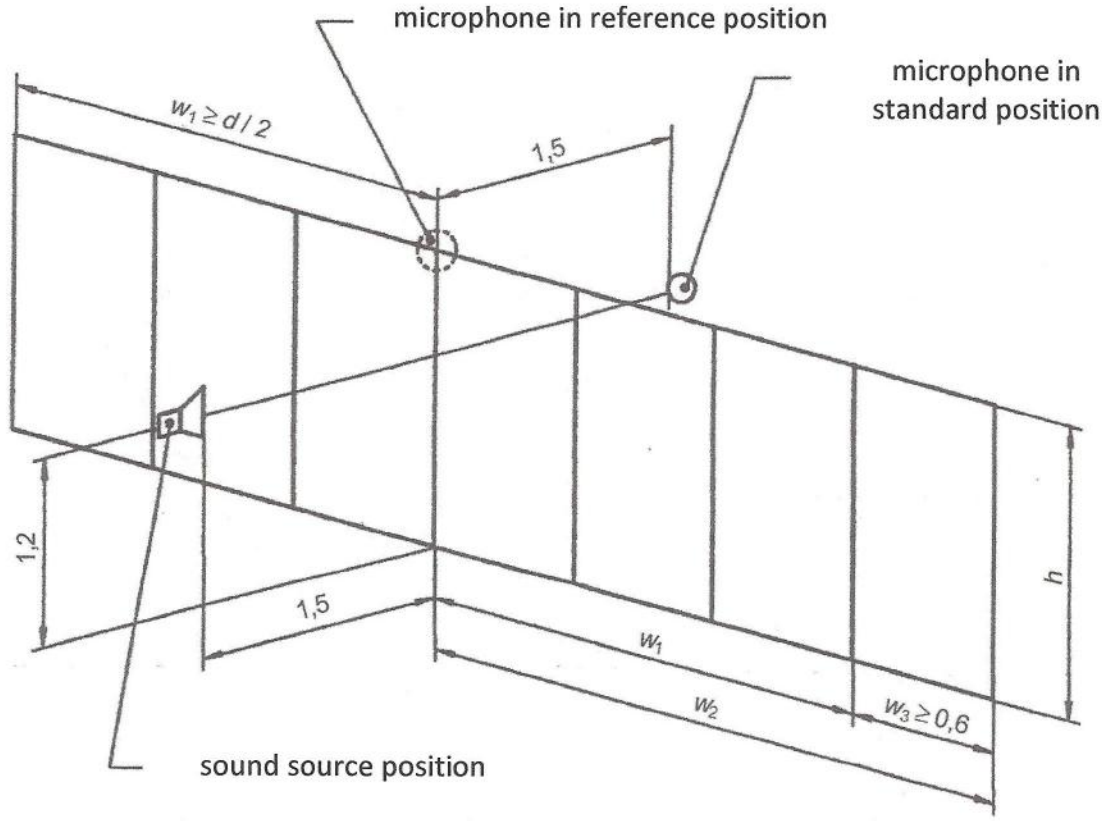

Fig. 1. Measuring setup for office screen sound attenuation tests.

3. Description of the tested object

Test sample designated as LA645 was "Wall" acoustic panels. Tested office screen consisted of 5 same panels, with dimensions of 1000x1600x50mm each. Panels construction: wooden frame, two layers of 20mm Basotect melamine foam with 6mm MDF board between them, polyester fabric.

Photo of actual measuring setup of "Creative Design Group Szymon Rychlik" office screen during the test in CTO S.A. is presented in fig. 2. Fig. 3 presents the front view of the tested office screen, with dimensions indicated on it.

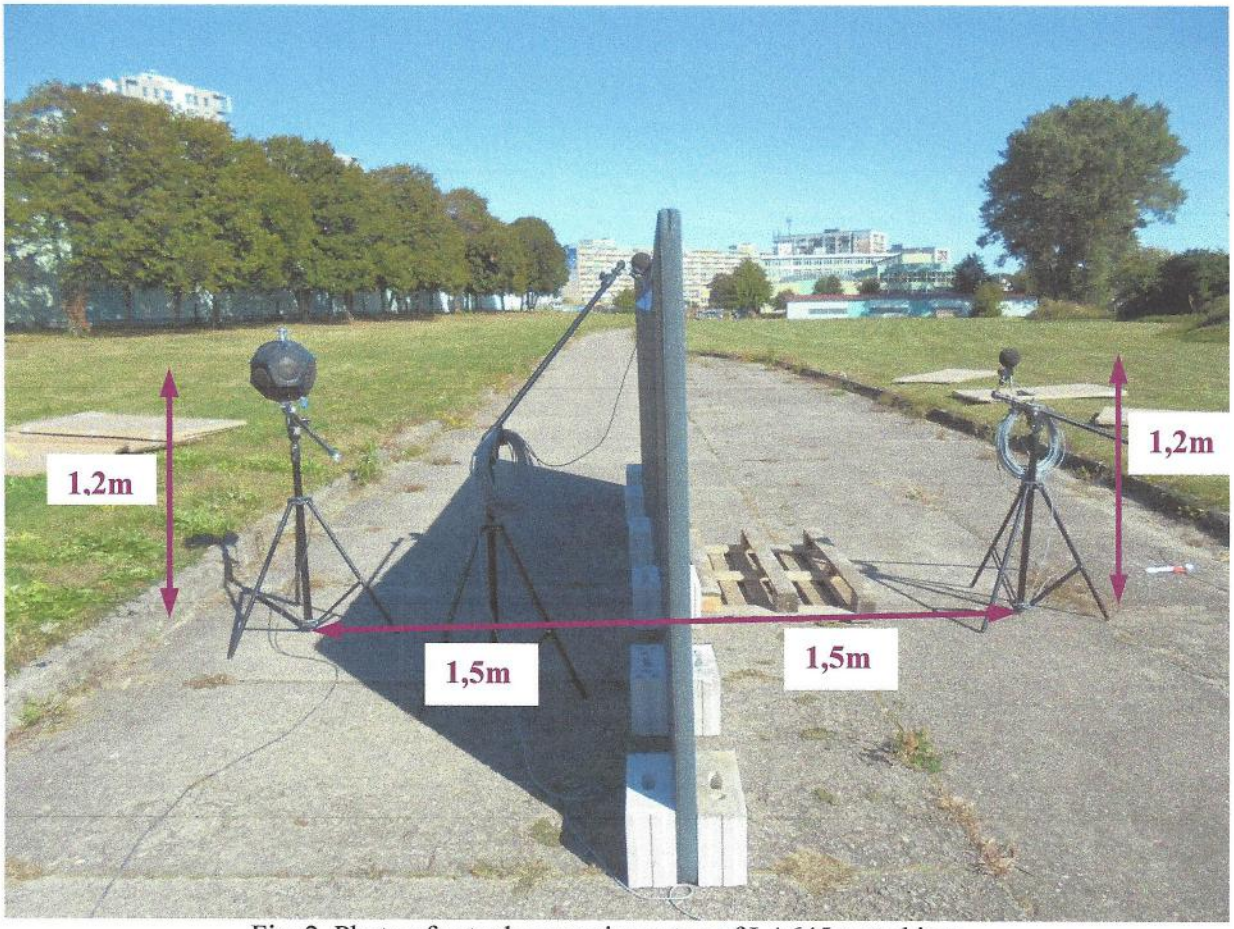

Fig. 2. Photo of actual measuring setup of LA645 test object.

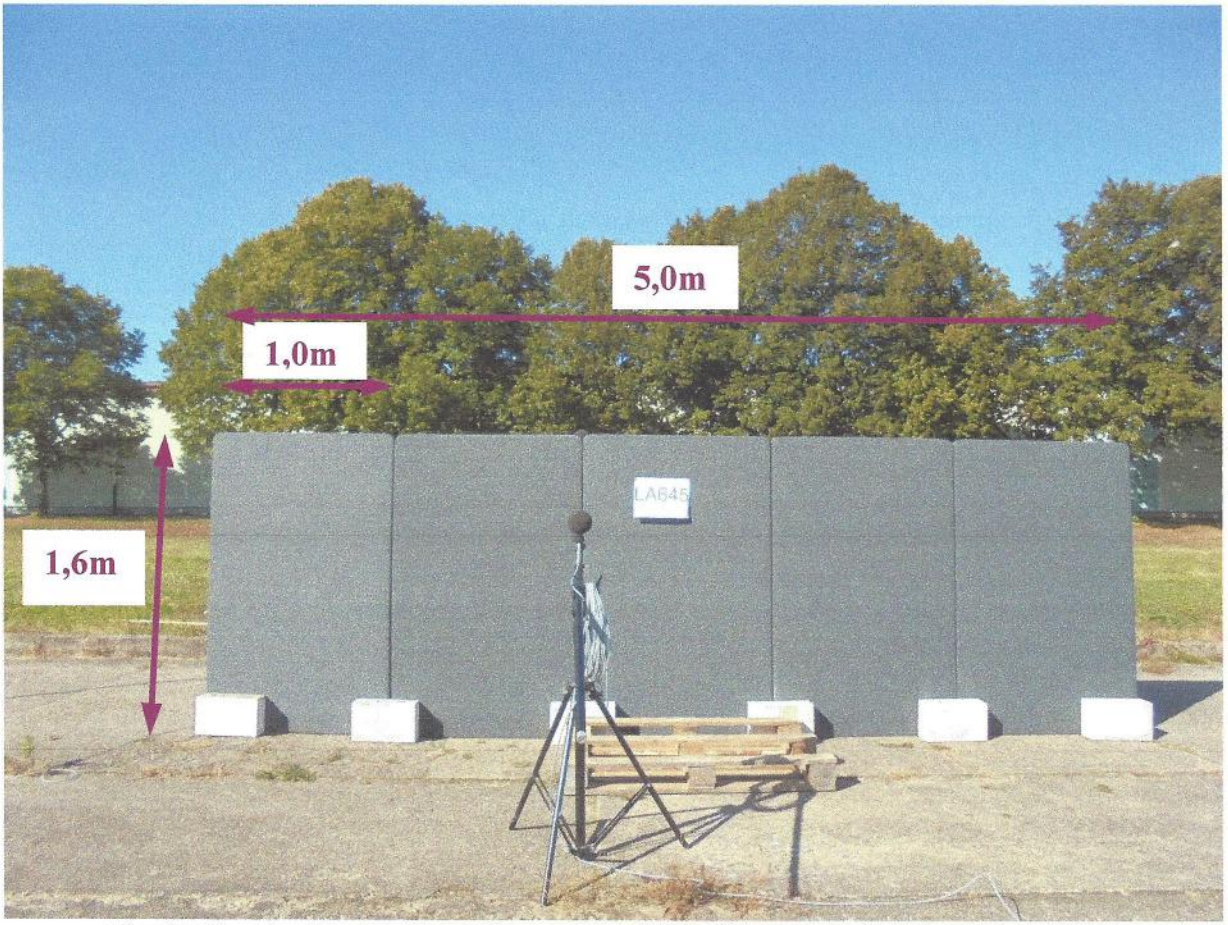

Fig. 3. "Creative Design Group Szymon Rychlik" office screen designated as LA645.

4. Measurement

Study was carried out in accordance with methodology described in PN ISO 10053:2001. Before the measurement, calibration of measuring channels was performed and environmental conditions were written down. Before the actual measurements, background noise was evaluated. Measurements for the reference microphone position were performed without the office screen. Afterwards measurements in the standard microphone position were done with the office screen installed. The test object was acclimatized according to procedure RS-11/R-06.

5. Analysis and summary of the test results

After the test, data from the analyzer were uploaded to MS Excel application and analyzed. The analysis resulted with ΔL_s values - screen sound attenuation in octave band together with evaluation index. Calculated values are presented in tab. 5 and as a graph in fig. 4. Measured background noise level is shown in tab. 2.

Tab. 2. Background noise level for LA645 test object measurement.

Frequency [Hz]	L_{eq} [dB]
100	42,4
125	40,0
160	38,4
200	37,0
250	36,0
315	34,8
400	34,7
500	35,3
630	36,8
800	37,8
1000	38,8
1250	36,8
1600	33,9
2000	30,6
2500	26,8
3150	23,7
4000	22,2
5000	21,1

ΔL_s values are derived from the following formula: $\mathbf{\Delta L_s = L_{po} - L_p - 20lg\ (R/r)\ dB}$. L_{po} is sound pressure level for the microphone in reference position and is presented in tab. 3. L_p is sound pressure level for the microphone in standard position and is presented in tab. 4. Distance between the sound source and standard microphone position is designated as R and amounts 3,05 m. Distance between the sound source and reference microphone position is designated as r and amounts 1,6 m.

Tab. 3. Measured L_{po} values for "Creative Design Group Szymon Rychlik" office screen designated as LA645.

Frequency [Hz]	L_{po} [dB]
125	91,0
250	103,3
500	102,2
1000	95,8
2000	90,9
4000	87,0
Sum	106,5

Tab. 4. Measured L_p values "Creative Design Group Szymon Rychlik" office screen designated as LA645, in octaves.

Frequency [Hz]	L_p [dB]
125	76,7
250	85,9
500	84,4
1000	73,6
2000	70,1
4000	62,7
Sum	88,7

Tab. 5. Office screen sound attenuation values ΔL_s together with evaluation index for LA645 test object, in octaves.

f [Hz]	ΔLs [dB]
125 Hz	8,7
250 Hz	11,8
500 Hz	12,2
1 kHz	16,6
2 kHz	15,1
4 kHz	18,7
Evaluation index	**15,0**

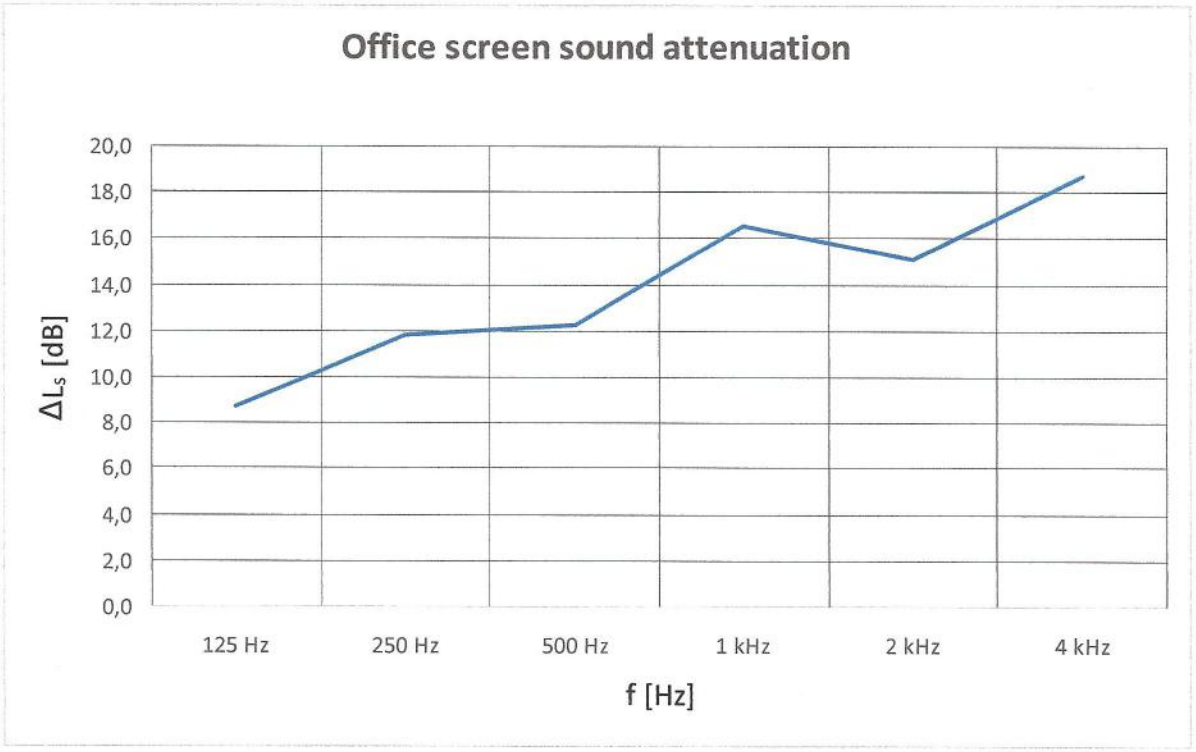

Fig. 4. Office screen sound attenuation as a function of frequency for LA645 test object.

1 appendix is attached to this test report:

- APPENDIX 1 - Minimum and maximum shift of directivity index of Larson Davis BAS001 sound source

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APPENDIX 1 – Minimum and maximum shift of directivity index of Larson Davis BAS001 sound source